

1. A method of gating for a medical imaging system, the method comprising:

selecting a non-electrical sensor from a group consisting of an acceleration sensor and a force sensor; and,

utilizing the non-electrical sensor to acquire information for gating.

2. The method of claim 1 further comprising gating within a magnetic resonance imaging system.

3. The method of claim 1 further comprising gating within a computed tomography imaging system.

4. The method of claim 1 further comprising gating within a PET-CT imaging system.

5. The method of claim 1 further comprising gating within an X-ray imaging system.

6. The method of claim 1 further comprising gating within an ultrasound imaging system.

7. The method of claim 1 further comprising determining timing of a gating signal to be prior to displacement of a body part of a patient.

8. The method of claim 1 further comprising obtaining a gating signal using signature analysis.

9. The method of claim 8 wherein using signature analysis includes providing a training set within a database and employing a pattern recognition technique to extract a gating signal.

10. A method of gating for a medical imaging system, the method comprising:

selecting a non-electrical sensor from a group consisting of an accelerometer, force sensor, ultrasonic sensor, strain gage, photodiode, and pressure sensor; and,

utilizing the non-electrical sensor to acquire information for cardiac gating.

11. The method of claim 10 wherein utilizing the non-electrical sensor comprises utilizing an accelerometer.

12. The method of claim 11 further comprising sensing cardiac vibrations with the accelerometer and acquiring an acceleration waveform with the accelerometer.

13. The method of claim 12 further comprising calculating a first derivative of the acceleration waveform to obtain a jerk waveform, determining a salient-peak of the jerk waveform, and utilizing the salient-peak as a trigger point for cardiac gating.

14. The method of claim 10 further comprising obtaining a gating signal using signature analysis.

15. The method of claim 14 wherein using signature analysis includes providing a training set within a database and employing a pattern recognition technique to extract a gating signal.

16. A method of gating for a medical imaging system, the method comprising:

selecting a non-electrical sensor from a group consisting of an accelerometer and a force sensor; and,

utilizing the non-electrical sensor to acquire information for respiratory gating.

17. The method of claim 16 wherein selecting a non-electrical sensor comprises selecting an accelerometer, the method further comprising obtaining an acceleration waveform with the accelerometer, integrating the acceleration signal twice to obtain a resultant signal, band pass filtering the resultant signal to remove frequencies that cause drift in the resultant signal and frequencies corresponding to cardiac motion to obtain a filtered signal, analyzing the filtered signal for salient peaks, and obtaining a trigger point for respiratory gating.

18. A method of gating for a medical imaging system, the method comprising:

selecting a non-electrical sensor from a group consisting of an accelerometer, force sensor, ultrasonic sensor, strain gage, photodiode, interferometer, laser, and pressure sensor; and,

utilizing the non-electrical sensor to acquire information for peripheral pulse gating.

19. The method of claim 18 wherein selecting a non-electrical sensor comprises selecting an accelerometer, the method further comprising arranging the accelerometer on a wrist of a patient.

20. The method of claim 19 further comprising obtaining an acceleration waveform from the accelerometer, calculating a time delay for information being transmitted from a heart of the patient to a peripheral pulse, and characterizing the signal.

21. A sensor assembly comprising:

a non-electrical sensor adapted for resting on a vibrating surface; and,

a patient-sensor interface having a first end and a second end, the first end adapted for securing to a patient, the second end coupled to the sensor.

22. The sensor assembly of claim 21 further comprising a sensor box for acquiring information from the sensor.

23. The sensor assembly of claim 22 further comprising means for signal processing and computer analysis, wherein the means for signal processing and computer analysis receives input from the sensor box.

24. The sensor assembly of claim 21 wherein the patient-sensor interface is fluid-filled, non-metallic, non-conducting tube.

25. A method of using a sensor for gating, the method comprising:

providing a non-electrical sensor;

providing a fluid filled transmission tube having a first end and a second end;

attaching the first end of the fluid filled transmission tube to the patient; and,

attaching the second end of the fluid filled transmission tube to a sensor.

26. The method of claim 25 further comprising placing the sensor out of a field of view during an imaging process.

27. The method of claim 25 wherein the patient has a heart, and wherein attaching the first end of the fluid filled transmission tube to the patient comprises attaching the first end to a chest wall of the patient adjacent the heart.

28. The method of claim 25 wherein the patient has a radial artery within a wrist, and wherein attaching the first end of the fluid filled conduction tube to the patient comprises attaching the first end to the wrist.

29. The method of claim 25 further comprising connecting the sensor to a sensor box via an electrical connection for recording information acquired by the sensor.

30. The method of claim 29 further comprising sending information from the sensor box to a signal processing and computer analysis station.

31. The method of claim 25 wherein providing a non-electrical sensor comprises providing a sensor having a bandwidth of at least 125 Hz.